

Current State and Perspectives of Sensitized Mesoporous Solar Cells

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Abstract

The sensitized nanocrystalline injection solar cell employs organic dyes or transition metal complexes for spectral sensitization of oxide semiconductors, such as TiO_2 , ZnO , SnO_2 , Nb_2O_5 . Mesoporous films of these materials are contacted with redox electrolytes, amorphous organic hole conductors or conducting polymers as well as inorganic semiconductors. Light harvesting occurs efficiently over the whole visible and near IR range due to the very large internal surface area of the films. Judicious molecular engineering allows the photoinduced charge separation to occur quantitatively within femtoseconds. The certified overall power conversion efficiency of the new solar cell for standard AM 1.5 solar radiation stands presently between 10 and 11 %.

The lecture will highlight recent progress in the development of solar cells for practical use. Major points to be covered concern the stability of operation of sealed cells under prolonged light soaking including UV-light exposure and the effects of thermal stress. Advancement in the understanding of the factors that govern photovoltaic performance as well as improvement of cell components to increase further its conversion efficiency will be discussed.

LITERATURE

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